

Serial No.: 10/808,264

PATENT APPLICATION
Docket No.: NC 96,200

REMARKS

Claims 1-7, 22-31, and 56-58 are pending in the application. No claims are presently allowed.

Claim 2 is amended to clarify that each Ar group is a phenyl group. Support for this amendment is found paragraph 0023, formula (3).

Claim 3 is amended to cancel the limitation that n may be 1.

Claims 22, 24, and 26 are amended to add the limitation from claim 1 regarding the structure of the Ar groups.

No new matter has been added.

Claim Rejections – 35 U.S.C. § 102

Claims 1 and 2 have been rejected under 35 U.S.C § 102(b) as allegedly anticipated by Keller et al. (US 4,259,471).

Claim 1 is to a polyaromatic ether comprising the formula $-(O-Ar)_n-$. Ar is an independently selected divalent aromatic radical with or without substituents containing one or more fused aromatic rings, one or more non-fused aromatic rings without intervening functional groups, or combinations thereof wherein the radical sites are on the same or different aromatic rings. n is an integer greater than or equal to 7.

Keller discloses the structure $C_6(CN)_2H_3-(O-\phi)_x-O-C_6(CN)_2H_3$ and states that it may be made by reacting an aromatic diol with 4-nitrophthalonitrile. The aromatic diol would be $HO-(O-\phi)_x-OH$, where x is from 1 to 10.

The reference is not enabling for all values of x. "Where a process for making the compound is not developed until after the date of invention, the mere naming of a compound in a reference, without more, cannot constitute a description of the compound." MPEP 2121.02, citing *In re Hoeksema*, 158 U.S.P.Q 596, 399 F.2d 269 (C.C.P.A 1968). The reference merely states that the aromatic diols are easily made by an Ullman ether synthesis, and cites to Williams, et al. and Hammann et al. (both attached) for further information (col. 3, line 68-col. 4, line 8). The examples in Keller only disclose the use of compounds having x = 1 and 2, and no syntheses of aromatic diols are disclosed. The longest chain disclosed in Williams is a four-ring product where x = 3 (p. 2504, right-hand col., line 18). The longest chain disclosed in Hammann would have x = 6 (p. 353, compound VI, synthesis on p. 354). The reagents disclosed cannot be

Serial No.: 10/808,264

PATENT APPLICATION
Docket No.: NC 96,200

combined to produce a longer chain according to the process disclosed.

Also attached is the declaration of Teddy M. Keller stating his expert opinion that the Ullmann ether synthesis cannot be used to make oligomeric or polymeric aryl ethers in high yield and high molecular weight.

Claim 2 is to the compound of claim 1 where all the Ar groups are m- or p-phenylene and is also asserted to not be enabled by the reference. It should be noted that in Hammann, the longest chain having only phenylene groups has $x = 3$ (p. 353, compound VII). All longer structures contain a biphenyl group in one of the repeat units.

Claims 3 and 4 have been rejected under 35 U.S.C § 102(b) as allegedly anticipated by Matzner et al. (US 5,084,530 or US 4,968,758).

Claim 3 is to an aromatic ether oligomer comprising the formula $T-Ar-(O-Ar)_n-T$. Ar is as defined above. Each T is either -OH, -Br, or -I. n is an integer greater than 1.

Matzner discloses the structure $HO-C_6H_4-O-C_6H_4-OH$ (col. 8, line 25). This would be equivalent to the claimed structure if n were equal to 1.

In order to make a *prima facie* case of anticipation, the reference must disclose each limitation of the claim. The reference does not disclose the limitation in claim 3 that n is greater than 1. As amended, claim 3 does not allow for n to be 1.

Claim 4 depends from and contains all the limitations of claim 3 and is asserted to distinguish from the reference in the same manner as claim 3.

Claim Rejections – 35 U.S.C. § 103

Claims 4-7, 22-31, and 56-58 have rejected under 35 U.S.C § 103(a) as allegedly unpatentable over Matzner et al. (US 5,084,530 or US 4,968,758).

Claim 4, dependent on claim 3, is to an aromatic ether oligomer comprising the formula $T-Ar-(O-Ar)_n-T$. Ar is as defined above. Each T is either -OH, -Br, or -I. n is an integer greater than 1 and no more than 100.

Matzner discloses the structure $HO-ArR'_d-R_1-ArR''_d-OH$ (col. 8, line 25). R_1 may be -O- and d may be 0. This would be equivalent to the claimed structure if n were equal to 1.

In order to make a *prima facie* case of obviousness, each claim limitation must be disclosed in the reference. As explained above, the reference does not disclose the limitation in

Serial No.: 10/808,264

PATENT APPLICATION
Docket No.: NC 96,200

claim 3 that n is greater than 1. Note that the claimed structure does not allow for any group between the aromatic groups other than $-O-$. As all the claim limitations of claim 4 are not disclosed in the reference, a *prima facie* case of obviousness has not been made.

Claims 5-7 depend from and contains all the limitations of claim 3 and are asserted to distinguish from the reference in the same manner as claim 3.

Further, as to claims 5 and 6, the claimed values for n are not disclosed in the reference.

As to claim 6, the reference does not disclose that both terminating groups are $-OH$ when n is greater than 1.

As amended, claim 22 is to a method of making the polyaromatic ether recited in claim 1 comprising reacting a dihydroxyaromatic with a dihaloaromatic in the presence of a copper compound and a base. Neither the dihydroxyaromatic nor the dihaloaromatic is present in an excess amount.

Matzner discloses reacting a dihydroxyaromatic with a dihaloaromatic (col. 19-20, equation VII). However, the reactants disclosed containing intervening groups such as isopropylene and sulphone. This results in a product having groups other than $-O-$ between the aromatic groups. Such products are now excluded from the claim. The difference is significant in that Matzner uses activating groups such as sulphone to make the reaction occur more easily. In the present claim 22, such groups are absent. As all the claim limitations of claim 22 are not disclosed in the reference, a *prima facie* case of obviousness has not been made.

Claims 23 and 56 depend from and contains all the limitations of claim 22 and are asserted to distinguish from the reference in the same manner as claim 22. Further, as to claim 23, this claim recites that the copper compound is CuI or $CuBr$. These copper compounds are not disclosed in the reference.

Claim 24 is to a method of making the polyaromatic ether recited in claim 1 comprising reacting a halohydroxyaromatic in the presence of a copper compound and a base. This is similar to claim 22, but requiring only one aromatic monomer having both the hydroxy and the halo group.

As explained above, Matzner discloses only products having groups other than $-O-$ between the aromatic groups. As all the claim limitations of claim 24 are not disclosed in the reference, a *prima facie* case of obviousness has not been made.

Serial No.: 10/808,264

PATENT APPLICATION
Docket No.: NC 96,200

Claims 25 and 57 depend from and contains all the limitations of claim 24 and are asserted to distinguish from the reference in the same manner as claim 24. Further, as to claim 25, the arguments regarding claim 23 apply to this claim.

Claim 26 is to a method of making the aromatic ether oligomer of claim 3, where n is greater than or equal to 1.

As explained above, Matzner discloses only products having groups other than —O— between the aromatic groups. As all the claim limitations of claim 26 are not disclosed in the reference, a *prima facie* case of obviousness has not been made.

Claim 27-31 and 59 depend from and contains all the limitations of claim 26 and are asserted to distinguish from the reference in the same manner as claim 26. Further, as to claim 27, the arguments regarding claim 23 apply to this claim.

As to claim 29, Matzner does not disclose the specific reactants or the products.

As to claim 31, Matzner does not disclose the additional step of reacting a haloterminated oligomer with a dihydroxyaromatic.

In view of the foregoing, it is submitted that the application is now in condition for allowance.

In the event that a fee is required, please charge the fee to Deposit Account No. 50-0281, and in the event that there is a credit due, please credit Deposit Account No. 50-0281.

Respectfully submitted,



Joseph T. Grunkemeyer
Reg. No. 46,746
Phone No. 202-404-1556
Office of the Associate Counsel
(Patents), Code 1008.2
Naval Research Laboratory
4555 Overlook Ave, SW
Washington, DC 20375-5325